

a semiconductor substrate having a semiconductor laser region and a semiconductor layer thereon,

wherein the semiconductor layer is the spot-size converter, and the refractive index of the semiconductor layer varies in a layer direction continuously or in a stepwise manner.

2. (Amended) A semiconductor laser device with a spot-size converter according to claim 1, wherein

the semiconductor layer is formed such that a region having the highest refractive index is substantially consistent with a central portion of light distribution emitting from the semiconductor laser region.

3. (Amended) A semiconductor laser device with a spot-size converter according to claim 1, wherein

another semiconductor layer is provided on a boundary plane between the semiconductor laser region and semiconductor layer, and the refractive index of the another semiconductor layer is approximately constant.

4. (Amended) A semiconductor laser device with a spot-size converter according to claim 1, wherein a dielectric layer is provided on a boundary plane between the semiconductor laser region and semiconductor layer.

5. (Amended) A semiconductor laser device with a spot-size converter according to claim 1, wherein the semiconductor laser device having a spot-size converter includes a further light waveguide region at an opposite side of the semiconductor laser region facing to the semiconductor layer.

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6. (Amended) A semiconductor laser device with a spot-size converter according to claim 2, wherein the semiconductor laser device having a spot-size converter includes a further light waveguide region at an opposite side of the semiconductor laser region facing to the semiconductor layer.

7. (Amended) A semiconductor laser device 3, wherein the semiconductor laser device having a spot-size converter includes a further light waveguide region at an opposite side of the semiconductor laser region facing to the semiconductor layer.

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8. (Amended) A semiconductor laser device with a spot-size converter 4, wherein the semiconductor laser device having a spot-size converter includes a further light waveguide region at an opposite side of the semiconductor laser region facing to the semiconductor layer.

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13. (Amended) A method for fabricating the semiconductor laser device with a spot-size converter of claim 1 comprising at least a semiconductor laser region emitting light from an end facet thereof and a semiconductor layer wherein the semiconductor laser region and the semiconductor layer are integrated on a

semiconductor substrate in a horizontal direction,

the method comprising the steps of:

forming a semiconductor multilayer functioning as the semiconductor laser region on the semiconductor substrate;

removing part of the first semiconductor multilayer by etching to have a substantially vertical cross-section thereof; and

forming the semiconductor layer in the etched region.

15. (Amended) A method for fabricating the semiconductor laser device with a spot-size converter of claim 1 comprising at least a semiconductor laser region emitting light from an end facet thereof and a light waveguide region wherein the semiconductor laser region and the light waveguide region are integrated on a semiconductor substrate in a horizontal direction,

the method comprising the steps of:

forming a first semiconductor multilayer functioning as the semiconductor laser region on the substrate;

removing part of the first semiconductor multilayer by etching to have a substantially vertical cross-section thereof;

forming a dielectric layer on a side of the etched region; and

forming a second semiconductor multilayer functioning as the light waveguide region in the etched region.